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EDITORIAL

Editorial

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It has taken two years from the appearance of the Call for Papers for the Special Issue on *Computational Methods in Finance* to the publication of the two issues of *Finance and Stochastics* that actually constitute this special issue. In its final form, the special issue consists of two specially invited survey papers, ten regular contributions, and two further contributions that will appear in a regular issue of *Finance and Stochastics* due to space limitations. All submitted papers have undergone the usual rigorous reviewing process, and of course there have been many more submissions than those that finally made it to acceptance.

The reasons for putting together such a special issue are the same today as at the time of the call for papers. Due to the increasing complexity of financial modeling on the academic side and of traded contracts on the security markets, there is a great need for a systematic treatment of computational problems. Computational finance should be more than a collection of some solved pricing problems; it should be a systematic part of mathematical finance that is also concerned with theoretical background and developments. We have therefore tried to cover some of these important aspects.

The special issue is mainly concerned with the areas of Monte Carlo methods in finance, numerical methods for Lévy processes in finance, and—on a smaller scale—computational problems related to credit derivatives. A paper on *Nonparametric estimation for a stochastic volatility model* by Comte, Genon-Catalot, and Rozenholc and one on *A generalization of Panjer's recursion and numerically stable risk aggregation* by Gerhold, Schmock, and Warnung will appear in regular issues.

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The first half of the special issue is mainly devoted to (Quasi-)Monte Carlo methods in finance. It contains a survey by L'Ecuyer on *Quasi-Monte Carlo methods with applications in finance*, an article by Kaebe, Maruhn, and Sachs on *Adjoint based Monte Carlo calibration of financial market models*, two articles by Giles, Higham, and Mao (*Analysing multi-level Monte Carlo for options with non-globally Lipschitz payoff*) and by Avikainen (*On irregular functionals of SDEs and the Euler scheme*) on applications of the multi-level Monte Carlo method, and *A new weak approximation scheme of stochastic differential equations by using the Runge–Kutta method* by Ninomiya and Ninomiya. The final contribution—as a non-Monte Carlo paper—presents work by Carmona, Fouque, and Vestal on *Interacting particle systems for the computation of CDO tranche spreads with rare defaults*.

The second half of the special issue is largely devoted to numerical methods for Lévy processes in finance. It contains a survey by Hilber, Reich, and Schwab on *Numerical methods for Lévy processes*, an article by Feng and Linetsky on *Computing exponential moments of the discrete maximum of a Lévy process and lookback options*, and an article by Kudryavtsev and Levendorskiĭ on *Fast and accurate pricing of barrier options under Lévy processes*. In addition, there are a contribution by Benhamou, Gobet, and Miri on *Smart expansion and fast calibration for jump diffusion*, one on *Computational methods for portfolio optimization problems in jump markets* by Bäuerle and Rieder, and an article on *Basket CDS pricing with interacting intensities* by Zheng and Jiang.

We hope that the readers of *Finance and Stochastics* will be as pleased with the special issue as we are.

Ralf Korn, Guest Editor for the *Special Issue on Computational Methods in Finance*

Martin Schweizer, Editor, *Finance and Stochastics*